



NASA STTR 2008 Phase I Solicitation

T6.01 Formation Flying and Automated Rendezvous and Docking

Lead Center: JSC

Current on-orbit automated rendezvous and docking (AR&D) capability in low-Earth orbit (LEO) is constrained by sensor and effector mass, power, and accuracy limits. NASA/JSC has developed a GPS receiver specifically to address the sensor constraints. Proposals are sought to develop an AR&D demonstration platform that utilizes two pico-satellites in LEO. Relative GPS will function as the primary sensor in a scenario that will include formation flying along with AR&D. The proposal should address pico-satellite (1) development and construction (volume: 10"x5"x5", mass: 5kg), power system implementation, (2) data downlinking, including ground stations, and (3) maneuvering effector implementation.

Pico-Satellite Automated Rendezvous and Docking Development and Test Platform

This solicitation seeks to improve the current automated rendezvous and docking (AR&D) technologies by validating the NASA designed GPS receiver in an on-orbit AR&D operational scenario and creating a platform for enhanced AR&D verification platform in the formation flying pico-satellites. First, two pico-satellites must be constructed to accommodate the NASA's GPS receiver and other state-of-the-art miniaturized sensors and efforts for a 30 day LEO mission. The pico-satellites must meet strict requirements for mass (less than 5kg), volume (5"x5"x10"), power generation (10W continuous), and space ruggedness (30 day LEO mission).

Phase 1 Requirements: Demonstrate the pico-satellite formation flying platform by 1) exit from a shuttle cargo bay as a single unit; 2) pico-satellite separation once the units have cleared the shuttle cargo bay; 3) maintain a LEO for 30 days; 4) transmit data from the GPS receiver to ground stations.

Phase 2 Requirements: Demonstrate the AR&D technologies by performing 1) exit from launch vehicle 2) maintain a predetermined flight formation for a given period of time; 3) perform a controlled AR&D maneuver; 4) transmit data from the GPS receiver and other sensors to ground stations.

